

IRRIGATION MATTER.

Subsoiling and Shallow Cultivation.
The irregular and in many places deficient rainfall of 1883 and '84 has increased the interest in the conserving of moisture, and caused a desire for better methods of retaining and utilizing all the water given.

In the eastern states it is thought worth while to carefully save the moisture, lack of fertility being one of the chief difficulties to overcome. We are not here in the west quite so careful in saving moisture as the east in husbanding fertilizers. It is a common sight in the fields of the west to see the plowman in the field day after day, turning up furrows perhaps twenty to forty and even fifty acres without harrowing or plowing, until he has completed the breaking of the field, and can cross-harrow; we thought also that his furrows turned up to the wind was allowed to lie loose and easily and to partially dry out did trouble him by growing as freely as weeds as those fields which are carefully husbanded from day to day. The problem however to the western farmer has been, "How shall one man and his team handle two acres of mixed crop?" Perhaps we are coming to a time when we must consider how we can with certainty raise a crop each year, and balance the advantages of certainty against a possibility of a crop on a much larger acre. Shall we continue to try to handle a large acreage with one man and team, or shall we try to increase the quantity per acre as well as the quality of favorable result by increased labor or fewer acres? To what extent can we apply the methods of the horticulturists and the market gardener to ordinary farming? Will the amount of labor that is used in preparing ground for trees, plants and vegetables be admissible on farm lands?

In the past two years there has been a marked interest in subsoil plowing with a view to retaining moisture. While this has not been found to equal shallow surface cultivation in retaining moisture, it has its place whenever the subsoil is very hard or such a character that surface rains do not readily soak into it or the roots of trees and plants do not readily penetrate it. Many of those who tried it in the spring of 1883 were disappointed in results obtained; for the reason that in many places winter and early spring had been so dry that soil moisture was only ten or twelve inches in depth. Under such circumstances, to rip up more of the dry subsoil which came up in lumps and remained in clouds until it dried, would have been as disastrous as to rip the bottom of the subsoiled furrow was in some cases detrimental. Much depended on the amount of work applied following the operation of subsoiling to pack the furrows. The best results from subsoiling are gained, first, by doing the work in the fall of the year, and second, by covering the subsoiled area with crop enough to soften the bottom of the subsoiled furrow in some cases detrimental. Much depended on the amount of work applied following the operation of subsoiling to pack the furrows. The best results from subsoiling are gained, first, by doing the work in the fall of the year, and second, by covering the subsoiled area with crop enough to soften the bottom of the subsoiled furrow in some cases detrimental.

Shallow cultivation of subsoil for the conservation of moisture arises from allowing a copious fall of rain to soak down further from the surface, where it is not so rapidly lost by evaporation, and can be retained with suitable shallow surface culture until adequately moistened in July and August. It has been abundantly demonstrated that subsoiling may be done over from spring to midsummer, and from year to year by shallow surface culture and not cropping so heavily as to rapidly exhaust the supply stored up. A field plowed in the ordinary manner may lose an inch and one-half of moisture in a week, which practically would be all the moisture contained in the first four inches of soil. Subsoiling, evidently, is to each day preserve or pack each acre plowed. Those who have no better tools may do this with the harrow.

It has been demonstrated repeatedly in the last two years, that weekly shallow cultivation does retain moisture. The construction of stone soil walls which allow the infiltration of surface water out of sight quickly under the influence of capillary action, gives back this moisture to sun and wind unless capillary action is intercepted by shallow surface culture, which is the cheapest and most available form of moisture known. Frequent cultivation to the depth of two to three inches will insure a moisture content under this surface culture in a way to accomplish the best results.

Should cultivation be delayed longer than weekly, capillary action succeeds in forcing its film of moisture through the loosened surface and increases loss results. In applying these principles to the cultivation of corn, it should be to the cultivation of corn that we are recommended the shallow plowing and covering of the evaporation from each stalk of corn is about two and eight-tenths pounds daily, or when a field is planted at ordinary distances, with the hills three feet eight inches apart and four stalks to the hill, there is a loss of about one hundred tons of water to the field from each acre. This leads to the thought that the field unit may suffer large and frequent checks, a smaller account less. The field of corn planted with two stalks in a hill has the use of all the moisture available for four stalks in a hill, and would, of course, be better supported.

In the growing of wheat in southern Minnesota, it has been found that when old crops are recently removed, the ground plowed and harrowed is pleased and kept under what is termed a fallow culture by harrowing once in ten days until time to drill in September, the weeds were kept in check, were not allowed to compete with any much needed moisture, nothing left the surface culture to crust, causing evaporation of moisture. Under this process a sufficient degree of moisture is found in the soil when time to drill wheat, September 15 to 20, to promptly germinate the wheat, giving it fair growth and sustain it into and through a dry winter. The winter is nearly as dry as summer, and the soil is dry, which is at this writing, March 4, is very promising, consider. Mr. John

Schultz, a leading farmer of Lake country, who annually grows about five hundred acres of wheat, has by methods similar to those, for fifteen years raised an average of twenty-five bushels per acre annually.

Mr. Schatz has been engaged in the last two years in trying to perfect the simplest method of cultivation which, briefly, is to plow stubble fields at the earliest possible date after removing the grain crop, and before seed and dry winds have been allowed to despoil any of the limited moisture contained. Daily as plowed the ground is broken over every part of the surface, leaving the surface loose for the retention of moisture and stability that it may not drift in high winds. Until winter his field is kept under cultivation at least once, perhaps two or three times a year to cover the soil and prevent erosion.

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